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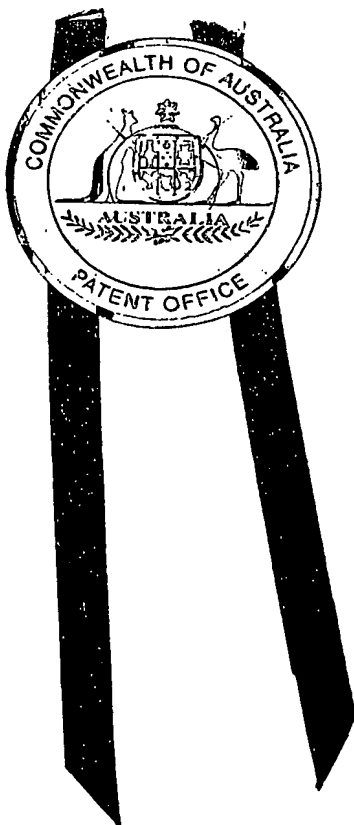
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I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PS 1381 for a patent by PARBEN PTY LIMITED as filed on 28 March 2002.

I further certify that the above application is now proceeding in the name of PLATYSYS PTY LTD pursuant to the provisions of Section 113 of the Patents Act 1990.

WITNESS my hand this  
Ninth day of April 2003

JONNE YABSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES



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AUSTRALIA  
*Patents Act 1990*

## PROVISIONAL SPECIFICATION

**PS**      **Filed 28<sup>th</sup> March 2002**

Invention Title : **Reconfigurable Switch**

Platysys Pty Ltd  
Applicant: **PARBEN PTY LTD**  
[A C N 095 254 103 ]

Inventors: **Christopher Stephens**



The invention is described in the following statement:

## RECONFIGURABLE SWITCH

This invention relates to a switch panel of the type used in networked *control* systems of the type typically used in building automation.

### 5    **Background to the invention**

10    In Building automation switch panels may carry a multiple of switches which can be configured to actuate a range of appliances from lights, alarm systems, washing machines, cooking appliances, air conditioners etc. Buildings are initially fitted out with a network and switch nodes which are usually later  
15    customized during commissioning to suit the particular requirements of each location within the building. This means that when tenants or owners move in, the network is customized to the tenant preferences by changing the functions and sometimes the number of switches at points within the building, such changes being typically made by replacement or modification of the existing  
20    switches. Sometimes the configurations need to be changed to accommodate additional or relocated appliances. Thus it is often necessary to increase or decrease the number of active switches on a panel. Conventionally this is done by replacing the switch and its associated integrated control circuit and reconfiguring the software that operates the system.  
25    Even in the case of standard electrical switches, such as common light switches, where no software control system is employed it is sometimes necessary to modify existing installations to operate in a different manner. For example, a switch plate may have three independent switching means to operate three independent light sources and it may be desirable to change this so that a single  
30    switch may operate all three light sources simultaneously. In such a case the conventional approach to this change would be to change the switch panel containing the three independent switches to a single switch unit panel. It is an object of this invention to provide a more convenient arrangement to facilitate changes to existing switch and control arrangements.

**Brief Description of the invention**

To this end the present invention provides a panel switch which includes

- a) a fixed unit, capable of carrying a multiple  $n$  of active switches
- b) a replaceable cover adapted to be attached to the fixed unit and able to carry up to  $n$  active contact closure positions
- c) wherein the covers only carry as many active positions as is desired so that the number of active switches on a fixed unit and the number of actuation positions can be changed by changing the cover.

This invention provides the advantage that one basic fixed switch unit usually mounted on a wall incorporating an integrated control circuit having  $n$  switches can be used with replaceable covers having any desired number of active switches from one up to  $n$ .

Throughout this specification contact closure means a device that when placed in an activation position adjacent a switch body is able to actuate a signal to change the logic state to power up or turn off an appliance. This may be a mechanical closure such as a toggle or a tactile switch in which pressure allows contact to be made in a signal circuit. It may also be a touch switch in which the touch or proximity of a finger actuates a signal. The contact closure may comprise one contact position and one switch closure position or a single contact position may operate a multiple of closures to send a multiple of signals.

Throughout this specification the term cover includes a cover plate, label, polycarbonate membrane switch or other member capable of carrying one or more contact closures. The cover is preferably capable of accurate registration over the fixed unit so that the closure positions on the cover will correspond with the closure positions on the fixed unit.

Preferably the switches are touch switches of the capacitive or charge transfer type and one of a pair of electrodes for each switch is carried on the fixed unit and one on the cover. Due to practical size considerations, the preferred number of switch units on the fixed unit is six but this number is not limited to six. For example in the case of a six switch fixed unit a cover plate having just a single switch unit when positioned over the fixed unit would be so arranged that

the operation or touch, in the case of a touch control interface, on the single switch means on the cover plate would simultaneously operate all of the six switches on the fixed unit. In the case of this example the six switch fixed unit would have been thus adapted to a single switch unit by the addition of just the cover plate. The change of cover plate to effect the change in operation of the fixed unit from a six to a one switch unit removes the need for a skilled technician being required to make physical changes to the fixed unit and to reprogram the system software to accommodate any change to the fixed unit wiring of the fixed unit.

10 In some circumstances such as for the visually impaired, tactile switches are preferred to touch switches so that the user can sense that the contact closure device has been actuated.

Any suitable touch switch which uses capacitance or charge transfer between an electrode or component on the cover plate and a complementary electrode on the switch body may be used.

Thus the number of cover plates needed to provide a full range of combinations is equal to the maximum number of switches provided on the fixed switch unit. When the switch cover plate is changed in some cases it may also be necessary to reprogram the system software to link an appliance to the additional switches or alternatively to delete or reassign the appliance when the number of switches is reduced. The reprogramming may be achieved using any of the available software programs. Some appliances are programmed to search for a switch. Alternately software of the kind described in USA patent 5530896 may be used to assign an address for the appliance. The reconfiguration can also be made by a technician using a lap top computer connected to the switch body's integrated circuit. There are also graphic software programs which can be used on the household computer to reconfigure the integrated circuit.

Another benefit of this invention in the case of some applications is that of redundancy. For example if a fixed unit has six switches each connected independently to a separate light source and it is desired to change the system so that only a single switch may operate all lights sources simultaneously then the system software may be changed so that any of the six switches may

operate all lights. In the case that any particular switch becomes inoperable due to a failure then the user still may operate all light by switching any of the other five switches that are still functioning. However, if the six switch fixed unit is modified to a single switch unit by changing the cover plate and if operation of the single switch unit on the cover plate operates each and all of the six corresponding switches on the fixed unit then it does not matter if one or even up to five of the fixed units switched were to fail as the operation of the cover plate switch would still also operate the remaining functioning fixed unit switch.

#### **Detailed description of the invention**

10 A preferred embodiment of the invention is described with reference to the drawings in which:

Figure 1 shows 5 interdigitated electrode arrays that can be printed on the back of a control panel;

Figure 2 is a view of the front surface of a switch panel having 4 switches;

15 Figure 3 is a view of the front surface of a switch panel having 3 switches;

Figure 4 is a view of the front surface of a switch panel having 2 switches.

The switch panels of this embodiment use charge transfer switch arrays of the kind marketed by Quantum Research Group as QMatrix™ and one example is the QT60040 matrix for touch control keys. These are used in appliances or in building automation applications where each switch position activates an appliance. These may be used in a network such a LonWorks™ networks.

20 The switch body [not shown] will have on its outer surface an array of printed interdigitated electrodes as shown in a) of figure 1. This has 5 switch positions. The same pattern is produced on the back of the cover plates which when mounted to the switch body are separated from the switch body array by a dielectric layer.

By interconnecting the interdigitated electrodes as shown in b) c) d) and e) the number of active switches can be reduced.

30 The four switch panel of figure 2 has a pattern as shown in b) of figure 1 on the reverse face corresponding to the switch positions. The diagonal interdigitation cancels the switch in the central position.

The three switch panel of figure 3 has the pattern shown in c) of figure 1 on its reverse face. Each outer pair of electrode arrays are connected to form one switch.

5 To produce a two panel switch the central electrode array is cancelled by a diagonal as shown in d) of figure 1 so that the outer pairs of electrode arrays on the back face correspond with the two switch positions as shown in figure 4.

A single central switch location can be used for the fully connected array of e) of figure 1.

10 In an alternate form of the invention the inactive electrodes on the back of the cover plate could be omitted.

From the above it can be seen that the present invention conserves inventory in that only one switch body is needed to cover 5 different switch panel configurations and the conversion from one configuration to another is achieved by simply changing the cover. Those skilled in the art will realize that any  
15 number of switch positions can be used depending on the capacity of the fixed unit and the corresponding physical size of the switch cover.

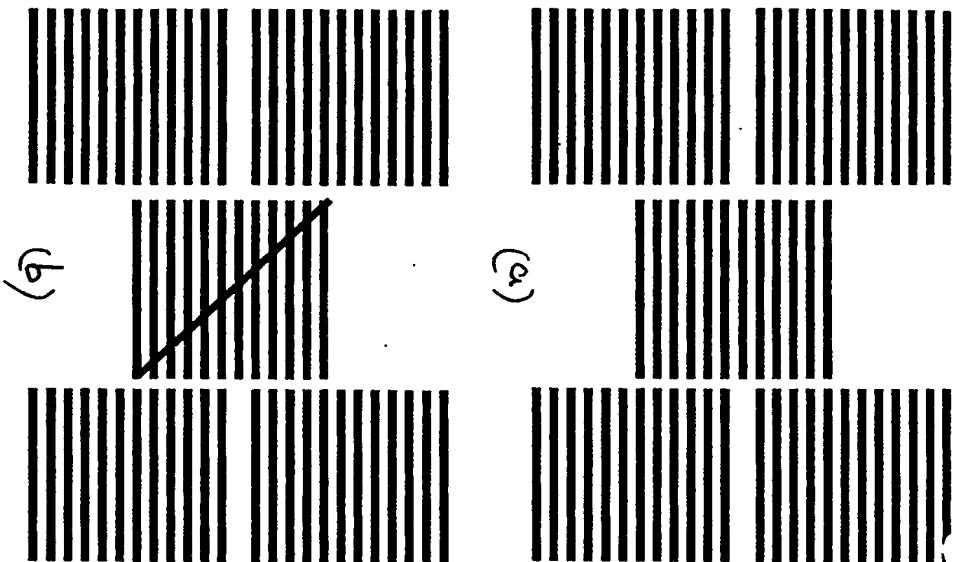
**CLAIMS**

1. A panel switch which includes
  - a) a fixed unit capable of carrying a multiple  $n$  of active switches
  - b) a replaceable cover for the fixed unit able to carry up to  $n$  active contact closure positions
  - c) wherein the covers only carry as many active positions as is desired so that the number of active switches on a fixed unit and the number of actuation positions can be changed by changing the cover.



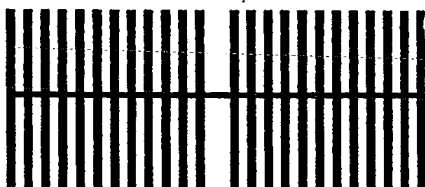
**ABSTRACT**

To simplify the reconfiguration of switches in a home automation switch panel touch switches of the capacitive or charge transfer type are configured so that the electrode pattern on the switch body can be  
5 activated using switch positions on a cover plate. The electrode pattern on the reverse face of the cover plate are selected so that a set of cover plates in combination with a single switch body provides as many switch positions as the body can provide. This makes reconfiguring, a matter of changing  
10 the front cover plate of the switch and using a software program to reconfigure the electronics.



(a)

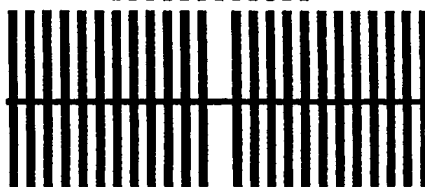
(b)



(c)



(d)



(e)

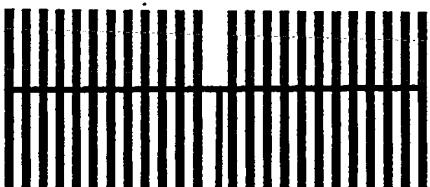
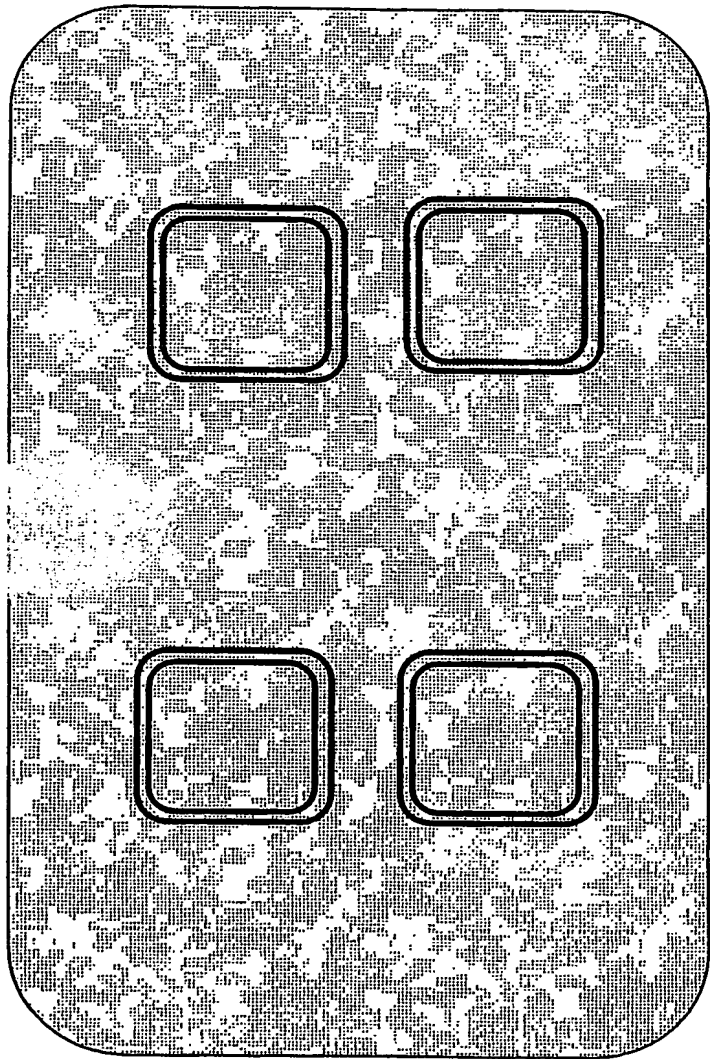


Figure 1

Figure 2



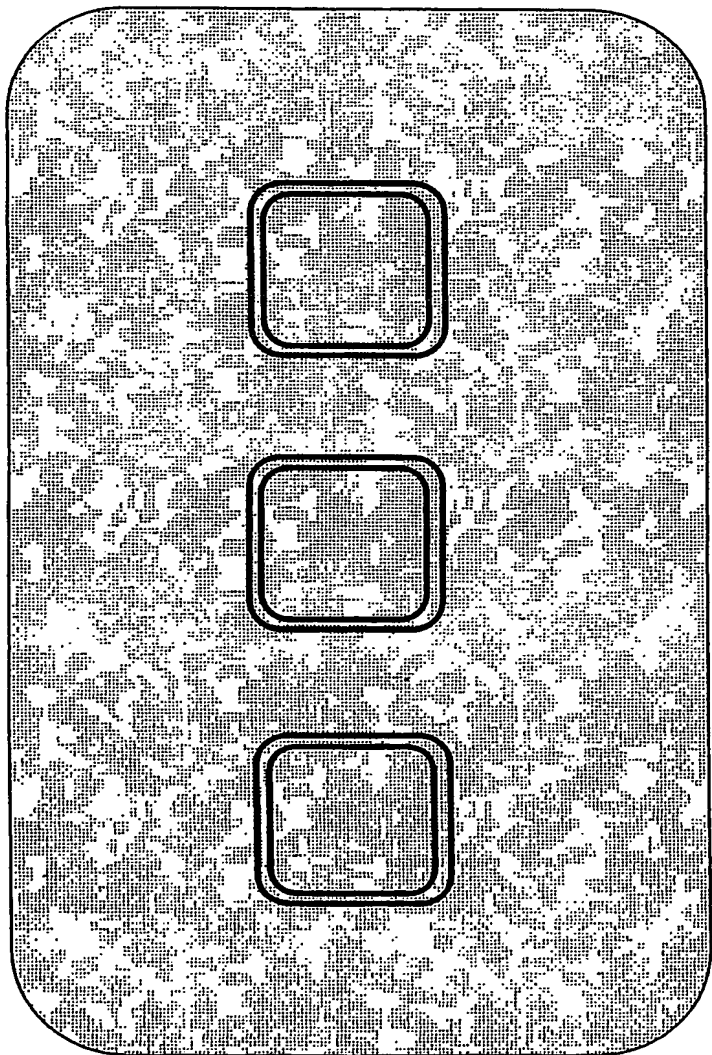
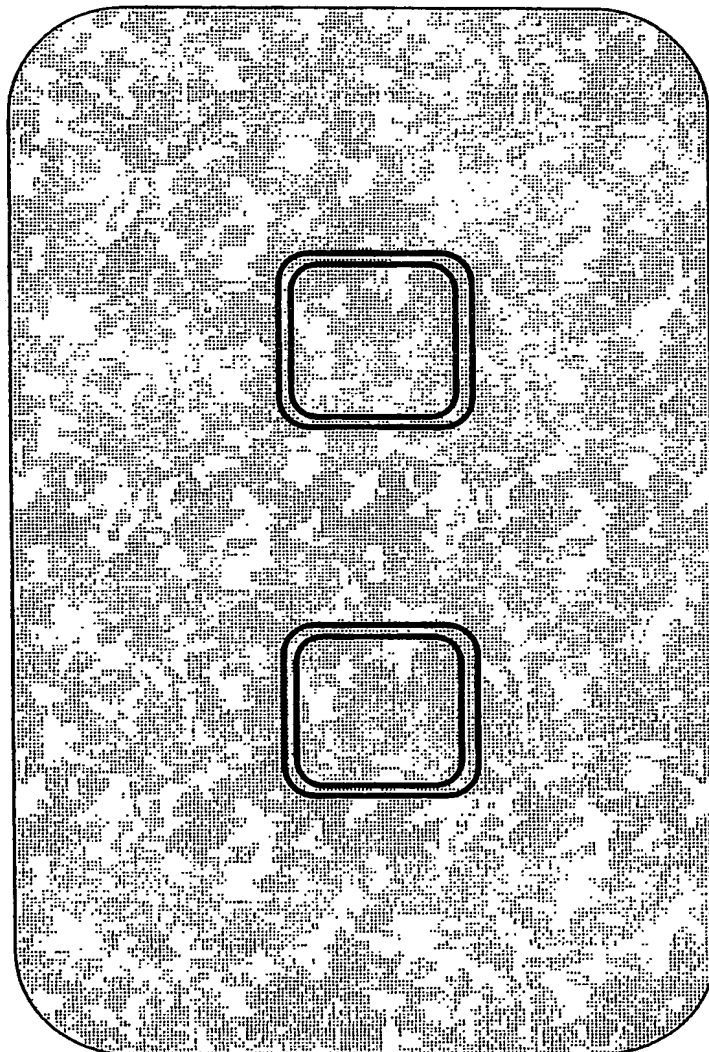


Figure 3

Figure 4



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